DDM Editor

The following topics are covered below:

- The DDMs Window
- Adding DDMs
- Modifying DDM Contents
- Searching for DDM Fields
- Modifying DDM Fields
- Editor Window Layout
- Setting Editor Options

DDMs Window

The "DDMs" node within the logical view displays a list of all DDMs.

To read the values of a DDM

1. In the "left window" choose "System Libraries" and open the folder "DDMs" in the "SYSEXDDM" library.
2. With a double-click open the desired file.

The following information is displayed for each DDM:

- **T** - Type.
- **L** - Level state.
- **Name** - Field name.
- **F** - Field format.
- **Len** - Field length.
- **S** - Suppresion.
- **D** - Descriptor type.

A DDM (data definition module) is a set of field definitions for a database file. A DDM can be created from a database file or from other DDMs.

DDMs are used to describe any type of database file, and are not restricted to Adabas database files. Some options described in this section only pertain to Adabas, and can be ignored if a different database system is being used.

Adding DDMs

- Adding DDMs from Adabas Databases
- Adding DDMs from SQL Databases
- Additional Options for VSAM Files

Adding DDMs from Adabas Databases

To create a new DDM for an Adabas database

1. From the **Object** menu, choose **New** and then, from the cascading menu, choose **DDM**.
   Or click the **Create a new DDM** toolbar button.
   The "New DDM - Select Database" dialog box appears.
2. If the "DBID - Database Type " list box is active, you can choose a DBID from the list. You can also enter a DBID in the range of 0 to 65535
   (except 255) in the "DBID edit control" field. Click **OK** to acknowledge.When you enter "DBID", which does not exist in the listbox, you can also select a type from the combobox. The "New Adabas DDM" dialog box appears in which the file number can be entered.
3. In the "File number" field enter a file number in the range of 1 to 5000 and choose **OK**.
   The DDM editor appears. If the database ID and file number correspond to an existing database file (FDT), then the fields contained in that database file are displayed. The DDM can then be edited as required.

Adding DDMs from SQL Databases

To create a new DDM for an SQL database

1. From the **Object** menu, choose **New** and then, from the cascading menu, choose **DDM**.
   Or click the **Create a new DDM** toolbar button.
   The "New DDM - Select Database" dialog box appears.
2. From the "DBID - Database Type" list box, choose an ID and choose **OK**.
   A "New SQL DDM" dialog box appears. It contains the text boxes "Table Owner" and "Table Name" and is used to select the SQL table to be added.
3. To list selected SQL tables, enter a pattern using the wildcard symbol ("*").
   To list all SQL tables for selection, in the text boxes, leave the asterisks and choose **OK**.
   A list box displays all SQL tables for selection according to the selection criteria specified above.
4. In the list box, select the desired SQL table and choose **OK**.
5. If you are accessing this SQL database for the first time in this session, then a "Database Logon" window appears (dependant from the SQL database). Enter the user ID and password for the database and choose **OK**.
   The SQL table is read into the DDM editor. It can be edited as required.

A name is generated automatically for the SQL DDM. It is a combination of the table owner and the table name and cannot be altered.

Note:
With the Natural program DDMGEN you can generate serveral DDMs in a particular library without using the editor.(available only under a local environment)

Note:
When working under a remote environment, this function is available only if Natural for DB2 or Natural for SQL/DS is installed. It is used to generate DDMs from DB2 or SQL/DS tables and is described in the documentation Natural for DB2 and Natural for SQL/DS respectively.

Additional Options for VSAM Files

The additional options for VSAM files consist of two parts: VSAM File Information and VSAM File Organization.

To define the VSAM file information

1. In the "VSAM file name" text box, enter the DDNAME/FCT entry as defined to the TP monitor.
2. If the "VSAM view" check box is set, this DDM represents a logical DDM. If it is unchecked, it represents a physical DDM.
   The following applies only if the "VSAM view" check box is set:
3. In the "Logical related to FNR" edit control, you can enter the file number of the physical DDM from which the logical file or DDM is derived.
4. In the "User defined prefix" edit control, you can enter the prefix value, which is to be assigned to the logical file.

To define the VSAM file organization

1. Set the type of the VSAM file by selecting one of the radio buttons.
2. If the "Compress file" check box is set, the file is to be compressed.
3. With the "Zones" combobox, you can select the zone for the VSAM file. ’F’ indicates, that all packed data are written to the VSAM file with the zone X’0F’. ’C’ indicates, that all packed values are written to the VSAM file with the zone X’0C’.

Note:
For more information concerning DDMs for VSAM, please refer to the Natural for VSAM documentation.

Data Conversion

Note: The following section applies under a local environment only!
If large and dynamic variables and/or fields are needed, please read the section DDM Generation and Editing for Varying Length Columns in the section Large and Dynamic Variables/Fields in the Natural Programming Reference documentation.

When a Natural program accesses data in a relational database, RDBMS-specific data types are converted to Natural data formats, and vice versa. The tables in this section show how Natural data formats correspond to data types in the following RDBMS's:

- Adabas D
- Adabas SQL Server
- DB2
- INFORMIX
- INGRES
- ORACLE
- SYBASE and Microsoft SQL Server

Adabas D

RDBMS Data Type	Natural Format/Length
boolean	L
char (*n*)	A*n*
date	A10
fixed (*p*,*q*)	N*p*-*q*,*q*
float	F8
integer	I4
long	A, DYNAMIC
long varchar	A, DYNAMIC
smallint	I2
string	A*n*
time	A8
timestamp	A26
varchar	A*n*

Adabas SQL Server

RDBMS Data Type	Natural Format/Length
char(5)	A5
char(253)	A253
decimal(5)	N5
decimal(10.4)	N(6.4)
double precision	N(10.6)
float(1...21)	N(2.6)
float(22...53)	N(10.6)
integer	I4
numeric(5)	N5
numeric(10.4)	N(6.4)
real	N(2.6)
smallint	I2

DB2

RDBMS Data Type	Natural Format/Length
date	A10
decimal(5)	N5
decimal(10.4)	N(6.4)
fixed character(5)	A5
float	F*n*
graphic	2*A*n
longvar	A, DYNAMIC
longvarg	A, DYNAMIC
large integer	I4
scientific notation	N(10.6)
small integer	I2
special data	A253
system date and time	A10
time	A8
timestmp	A26
varchar	A*n*
varg	2*A*n

INFORMIX

RDBMS Data Type	Natural Format/Length
byte	B*n*
char(*n*)	A*n*
date	A10
datetime	A26
decimal(*p*,*q*)	N*p*-*q*,*q*
double precision	F8
float	F8
integer	I4
interval	A17
money	N(14.2)
numeric	N*p*-*q*,*q*
real	F4
serial	I4
smallint	I2
smallfloat	F4
text	A*n*
varchar(*n*)	A*n*

INGRES

RDBMS Data Type	Natural Format/Length
byte varying	B*n*
c(*n*)	A*n*
char (*n*)	A*n*
date	A10
double precision	F8
float	F8
float4	F4
integer	I4
integer1	I1
long byte	B, DYNAMIC
long varchar	A, DYNAMIC
money	N(12.2)
object_key	B16
real	F4
smallint	I2
table_key	B8
text (*n*)	A*n*
varchar (*n*)	A*n*

ORACLE

RDBMS Data Type	Natural Format/Length
char (*n*)	A*n*
date	A10
decimal (*p*,*q*)	N*p*-*q*,*q*
double precision	F8
float	F4
integer	I4
long	A, DYNAMIC
long raw	B, DYNAMIC
number	N*n*
nvarchar2	A*n*
raw (*n*)	B*n*
real	F4
rowid	A*n*
smallint	I2
varchar	A*n*
varchar2 (*n*)	A*n*

SYBASE and Microsoft SQL Server

RDBMS Data Type	Natural Format/Length
binary (*n*)	B*n*
bit	N1
char (*n*)	A*n*
datetime	A26
float	F8
image	B*n*
int	I4
money	N(15.4)
nchar (*n*)	A*n*
nvarchar (*n*)	A*n*
real	F4
smalldatetime	A26
smallint	I2
smallmoney	N(6.4)
text	A*n*
timestamp	B8
tinyint	I2
varbinary (*n*)	B*n*
varchar (*n*)	A*n*

Modifying DDM Contents

Note:
The access to DDMs may be restricted when Natural Security has been installed. Within the DDM security profile, there may be a definition of whether a DDM may be modified only by specific users (DDM modifiers) or the owners of the security profile.

For further information refer to the Natural Security documentation for OpenVMS, UNIX and Windows NT, under "DDM Restrictions" section DDM Security Profiles.

- Selecting Fields
- Selecting Attributes in Fields
- Copying Fields
- Cutting Fields
- Pasting Fields
- Deleting Fields
- Inserting Fields

Selecting Fields

To select one or more fields in the DDM editor

1. Put the mouse pointer on the left margin of the field and click.
   Click on the first field to be selected and press **SHIFT+DOWN ARROW** or **SHIFT+UP ARROW**.
   The field is highlighted.
2. To select more contiguous fields, press **UP ARROW** or **DOWN ARROW**.
   The contiguous fields are highlighted.

To select all of the fields in the DDM editor

- From the **Edit** menu, choose **Select all**.
  All of the fields in the editor are highlighted.

Selecting Attributes in Fields

To select an attribute in a field in the DDM editor

- Put the mouse pointer on the attribute and click.
  Or use **TAB**, **SHIFT+TAB**, **UP ARROW**, and **DOWN ARROW** to navigate to the desired field.
  The field attribute is highlighted and surrounded by a box.

Copying Fields

To copy fields in the DDM editor

1. Select the fields you want to copy using the instructions found in Selecting Fields.
2. From the **Edit** menu, choose **Copy**.
   Or click the **Copy** toolbar button.
   Or press **CTRL+C**.
   The fields are copied to the clipboard and can be pasted within the same DDM or another DDM. For instructions on pasting fields, see Pasting Fields.

Cutting Fields

The cut function can be used to delete fields from a DDM or to move fields within/between DDMs. When text is cut, it is taken from the DDM and placed on the clipboard. It remains there until the next cut or copy operation is performed, at which time it is irretrievably discarded from the clipboard to make way for the next cut/copied field.

To cut fields in the DDM editor

1. Select the fields you want to cut using the instructions found in Selecting Fields.
2. From the **Edit** menu, choose **Cut**.
   Or click the **Cut** toolbar button.
   Or press **CTRL+X**.
   The fields are cut to the clipboard and can be pasted within the same DDM or another DDM. For instructions on pasting fields, see Pasting Fields.

Pasting Fields

The paste function is used to place a field at a specific position within a DDM after it has been copied or cut to the clipboard from another position within the same DDM or another DDM. A field which has been copied or cut to the clipboard can be pasted repeatedly without recopying it.

To paste the fields in the DDM editor

1. Cut or copy DDM fields as described in Cutting Fields or Copying Fields.
2. If the fields are to be pasted in another DDM, open the DDM.
3. Select the field after/before which the copied/cut fields are to be pasted.
   Whether the field is pasted before or after the selected field is determined by the "Insert" option specified in the "Options" menu. For more information on the insert options, see Setting Editor Options.
4. From the **Edit** menu, choose **Paste**.
   Or click the **Paste** toolbar button or press **CTRL+V**.
   The field is pasted in the DDM.
5. To paste the same field again, repeat Steps 2 through 4.

Deleting Fields

When a field is deleted, it is cut from the DDM but is *not* placed on the clipboard. There is no way to recover the field once deleted.

To delete fields from the DDM editor

1. Select the fields you want to delete using the instructions found in Selecting Fields.
2. From the **Edit** menu, choose **Delete**.
   Or click the **Delete** toolbar button.
   Or press **DEL**.
   The fields are deleted from the DDM and cannot be recovered.

Inserting Fields

You add fields to a DDM by inserting them. The insert function has two different modes depending on the context in which you use it.

- If you are editing a DDM which belongs to an active database, then you must select a field from the existing DDM for insertion. You can then modify this field.
- If you are editing a DDM which does not belong to an active database, then you can insert an empty DDM field which you fill as required.

In both cases, the field is inserted either before the selected field or after the selected field, depending on the current editor option setting.

To insert a field into the active DDM

1. In the DDM, select a field.
2. From the **Field** menu, choose **Insert**.
3. If you are editing a DDM which does not belong to an active database, then a blank line is inserted before/after the selected field.
   Enter a value for each field attribute.
   Use **TAB** to move from one column to the next.
   Whether the field is pasted before or after the selected field is determined by the **Insert** option specified in the **Options** menu. For more information on the Insert option, see Setting Editor Options.
4. If you are editing a DDM which belongs to an active database, then a "Field Selection List" window appears and one of the fields can be selected. The field selected in the field selection list is inserted before/after the field selected in the DDM.

Modifying DDM Fields

Modifying Extended Attributes under a Local Enviroment

To display and edit the extended attributes of the fields contained in the DDM

1. In the active "DDM" window, select a field.
2. From the **Field** menu, choose **Extended fields**.
   Or click the **Extended Fields** toolbar button.
   The "Extended Attributes" dialog box appears with the name of the selected field.
3. If a header exists for the selected field, it appears in the "Header" text box. You can edit the header, or add a header if none exists.
4. If an edit mask exists for the selected field, it appears in the "Edit Mask" text box. You can modify the edit mask, or add an edit mask if none exists.
   The edit mask must conform with Natural syntax rules and be valid for the field length and format. (See the section Edit Masks in the Natural Reference documentation.)
5. If a remark exists for the selected field, it appears in the "Remarks" text box. You can edit the remark, or add a remark if none exists.
6. To save any changes you have made to the current field choose **Save**.
7. To view and edit extended attributes for the next field in the DDM, choose **Next**.
8. To view and edit extended attributes for the previous field in the DDM, choose **Prev**.
9. To save and validate all field modifications and return to the "DDM" editor window, choose **OK**.

Modifying Extended Attributes under a Remote Enviroment

Note:
Applies only for DDM’s generated for VSAM

To display and edit the extended attributes of the fields contained in the DDM

1. In the active "DDM" window, select a field.
2. From the **Field** menu, choose **Extended fields**.
   Or click the **Extended Fields** toolbar button.
   The "Extended Attributes" dialog box appears with the name of the selected field.
3. If a header exists for the selected field, it appears in the "Header" text box. You can edit the header, or add a header if none exists.
4. If an edit mask exists for the selected field, it appears in the "Edit Mask" text box. You can modify the edit mask, or add an edit mask if none exists.
   The edit mask must conform with Natural syntax rules and be valid for the field length and format. (See the section Edit Masks in the Natural Reference documentation.)
5. If an alternate descriptor (Type A) or superdescriptor (Type X) is defined for the field, you can enter an alternative index name.
6. If the field is a multiple or periodic group field, you can specify the number of occurences in the "Maximum Occurence" edit control box.
7. If an alternate descriptor (Type A) or superdescriptor (Type X) is defined for the field, you can set the flags "Upgrade", "Unique Key", "Sort" and "Null" in the "Extended Attributes" dialog box.
8. If the field has a primary or secondary key descriptor (Type A) or superdescriptor (Type X), you can select the database shortname from the combo box.

9. If a remark exists for the selected field, it appears in the "Remarks" text box. You can edit the remark, or add a remark if none exists.
10. To save any changes you have made to the current field choose **Save**.
11. To view and edit extended attributes for the next field in the DDM, choose **Next**.
12. To view and edit extended attributes for the previous field in the DDM, choose **Prev**.
13. To save and validate all field modifications and return to the "DDM" editor window, choose **OK**.

Displaying Descriptor Information

With this function you can display the makeup of a subdescriptor field or a superdescriptor field.

To do so

1. In the descriptor field, select a descriptor type.
2. From the **Field** menu, choose **Sub-/Superdescriptor Info**.
   Or click the **Descriptor Definition** toolbar button.
   The "Descriptor Definition" dialog box appears with the name of the selected subdescriptor or superdescriptor next to "Field name".
3. Choose **OK** to exit the field definition dialog.

Modifying a DDM Header

To edit the DDM header information

1. From the **DDM** menu, choose **DDM header**.
   Or click the **DDM Header** toolbar button.
   The "DDM Header Information" dialog box appears with the names of the current DDM (Remote and Local) and library (Local only) appearing at the top of the box.
2. In the "DBID" drop down list box you can choose a DBID out of the list. You can also enter a DBID in the range of 0 to 65535 (except 255) in the "DBID edit control" field. When you enter "DBID", which does not exist in the listbox, you can also select a type from the "Type" combobox.
3. To change the file number to which the DDM is assigned, enter a new value in the range of 1 to 5000 in the "File ID" edit control field.
4. In the "Default Sequence" text box, enter a short name as default sequence.
   The system validates your entry based on the selected file number.
   Note for Adabas only:
   If the database is accessible, then the short name is verified to determine if it exists. If it does not exist, then a list is presented with a selection of valid short names. If the database is not active, a list cannot be generated.
5. Choose **OK** to save the new values.

Modifying Coupling Information

This option only applies for Adabas DDMs and has only informational character.

If you select this option, all files physically coupled to the displayed DDM are listed together with the short names of the descriptors used for coupling.

To define a coupled file

1. In the "File Name" text box enter the name of the coupled file.
2. In the "File Number" text box enter the number of the coupled file.
3. In the "From" edit control, enter the database short name, at which the file coupling begins.
4. In the "To" edit control, enter the database short name, at which the file coupling ends.
5. Press the "Insert" push button to add the defined entry to the list box.
6. Press the "Delete" push button to remove the selected entry from the list box.

For further information on physical file coupling please refer to the Adabas documentation.

Searching for DDM Fields

In large DDMs, it is often difficult to locate DDM fields. Using the search function you can flexibly search for DDM field names. If it should be necessary to replace a frequently occurring field name with another, you can use the combined search and replace function.

1. From the **Edit** menu, choose **Find**.
   Or click the **Find the specified text** toolbar button
   or press **CTRL+F**.
   The "Find" dialog box appears.
2. In the "Find Field Name" text box, enter the string to be searched for.
3. If you want the search string to be found as a whole word only and not as part of other words, select the "Match Whole Words Only" text box.
   If this box is left unselected, all occurrences of the string will be found.
4. In the "Direction" group frame, click the search direction up or down to specify whether the search will be conducted from the cursor position to the end of the object or from the cursor position to the beginning of the object. The default is "Down".
5. Choose **Find Next.**

If no instance of the text searched for is found, a corresponding message is displayed.

If an instance of the search string is found, it will be displayed.

To search for additional instances of the search string in the object

- From the **Edit** menu, choose **Find Next**.
  Or press **F3**.

Searching for and Replacing DDM Field Names

To search for and replace a text string in the active DDM window

1. From the **Edit** menu, choose **Replace**.
   Or click the **Replace Text** toolbar button.
   Or press **CTRL+H**.
   The "Replace Data Field" dialog box appears.
2. In the "Find Field Name" text box, enter the string to be searched for.
3. In the "Replace with" text box, enter the replacement string.
4. If the search string to be found as a whole word only and not as part of other words, select the "Match whole words only" text box.
   If this box is left unselected, all occurrences of the string will be found.
5. In the "Direction" group frame, choose the search direction up or down to specify whether the search and replace will be conducted from the cursor position to the end of the object or from the cursor position to the beginning of the object. The default is "Down".
6. Choose **Replace**.
7. Choose **Close** to exit the dialog.
   If no instance of the text searched for is found, a corresponding message is displayed.

Repeat Replace

- To do so, from the **Edit** menu, choose **Replace Next**.
  Or press **CTRL+F3**.

Replace All

With the "Replace All" function one can replace all strings at one time.

Note:
If "Replace All" is executed, all the found strings will be replaced. The "UNDO" function is not available.

Editor Window Layout

You can adapt several editor properties and functions to your own requirements. These options regulate how the editor appears and how it reacts to various types of input. For example, you can specify whether or not you want your editor window to display a status line or column header.

- Setting Editor Options
- Status Bar Information
- Column Header

Setting Editor Options

DDM Editor Options

You can set preferences for various editor options. These settings are taken as default values each time you start the DDM Editor.

To set options

- From the **Tools** menu, select **Options** and then in the options dialog select the tab "DDM Editor".

Insert before

Insert a field before the field currently selected.

Insert after

Insert a field after the field currently selected.

Status Bar

Display the status line at the top of the editor window. For information on the status line contents, see Status Bar Information.

Column Header

Display the column header at the top of the editor window. For information on the column header, see Column Header.

Short Names

Display the short name (the Adabas 2-character field name) for each field in the DDM. The short name appears under the column header SN.

If you create a new DDM field manually and the database short names are switched OFF, the editor generates a new "unused" short name for the field; this means that for this field there is no link between the database file and the DDM. Therefore, if you have to create a new DDM field, use the "Insert field" function to link the new field to the database file.

Status Bar Information

The status bar appears at the top of the window where the DDM is edited. It displays the following information:

- **Line** - The current cursor line position and the total number of lines in the DDM.
- **DBID** - The ID of the database from which the DDM is derived.
- **FNR** - The number of the file of the database from which the DDM is derived.
- **Type** - The Type of the database from which the DDM is derived.
- **Default Sequence** - The field that controls the logical sequential reading of the file when no field is specified in the READ statement of the Natural program.

Column Header

The column header line contains the following column headers for the DDM fields:

Column Header	Description
T	Adabas Field Type: **G** - Group **P** - Periodic group **M** - Multiple-value field **Blank** - Elementary field ***** - Comment
L	The level number assigned to the field.
SN	The 2-character field name (for ENTIRE-DB: 5-character field name). Is displayed/hidden depending on whether short names option is selected or not. For DL/I segment types, the 2-character code which is used in DL/I. For VSAM files, see the documentation Natural for VSAM.
Name	A 3 - to - 32 character field name. This is the field name used within the Natural program to reference the field. **Note:** In SQL DDMs the field name can be from 1 - to - 32 characters. DL/I: The external field name may be up to 19 characters long.
F	The format of the field. For more information on Natural formats, see the Natural Reference documentation.
Len	The standard length of the field. This length can be overridden by the user in a Natural program. For numeric fields (format N), length is specified as "*nn.m*", where "*nn*" represents the number of digits to the left of the decimal point and "*m*" represents the number of digits to the right of the decimal point. **Only for SQL DDMs:** In the length input field, you can specify either the field length as a numeric value or enter the keyword "DYNAMIC" to specify that the field length is variable. For further information see section Large and Dynamic Variables/Fields.
S	Null Value Suppression Option: **N** - Field is defined with the Adabas null value suppression option. See note at end of table. **F** - Field is defined with the Adabas fixed storage option. See note at end of table. **M** - Not null. **Blank** - Indicates no field suppression.
D	Descriptor Option: **D** - Field is an Adabas descriptor. **S** - Field is an Adabas subdescriptor or superdescriptor. **H** - Field is an Adabas hyperdescriptor. **N** - Field is an Adabas non-descriptor. **Blank** - Field is a normal field.

Note:
The value N under column header S means that null values for the field are not stored in the Adabas inverted list and will not be returned when the field is used to construct a basic search criterion (WITH clause of a FIND statement), in a HISTOGRAM statement, or in a READ LOGICAL statement.

Note:
The value F under column header S indicates that no compression is performed on the field. The field is stored according to its standard length.

Note:
For more information concerning DDMs for VSAM, please refer to the VSAM mainframe documentation.

Note:
For more information concerning DDMs for DL/I, please refer to the DL/I mainframe documentation.

